

later Permian relations, while the Protopityæ of the Culm are more ancient allies, with similar characteristics. We thus learn how far back we must go, in the series of geological formations, in order to meet with the last traces of the common ancestors of those classes in the vegetable kingdom which are now living.

By his discovery of Archegoniate plants with secondary growth, Williamson however came into collision with the doctrines of Adolphe Brongniart, otherwise so highly revered by him, who held this character to be an absolute criterion of the Phanerogams, and denied the possibility of its occurrence in other classes of the vegetable kingdom. Hence a literary feud arose between Williamson and B. Renault, Brongniart's distinguished pupil. The latter endeavoured to prove that Williamson was in error in the identification of his *Lepidodendra*, that they were really *Sigillaria*, and together with the latter belonged to the Gymnosperms, while the truly Archegoniate *Lepidodendra* were destitute of any secondary growth. The answer was not long in coming; proof was heaped on proof, until ultimately the real state of the case was made completely clear. In all essential points victory was on the side of our author. Other subsidiary differences respecting *Stigmara*, the Calamariæ, &c., require no more than a mention here.

It was thus made evident by Williamson that cambial growth in thickness is a character which has appeared repeatedly in the most various families of the vegetable kingdom, and was by no means acquired for the first time by the Phanerogamic stock. This is a general botanical result of the greatest importance and the widest bearing. In this conclusion Palæontology has, for the first time, spoken the decisive word in a purely botanical question. The result has proved well worth the great trouble and labour which had to be gone through in order to attain it.

It would be difficult to conceive a more magnificent monument to Williamson than one which he himself set up at Manchester, in one of the halls of the Owens College Museum.

In the year 1887 there was discovered in a quarry near Bradford, a gigantic petrified tree-stump, which, when carefully exposed, was found to run out at the base into a widely-spreading system of ramifications of a Stigmarian character. In the quarry this precious relic, like many others before it, would in a very short time have fallen a victim to destruction by weather and the hand of man. Williamson, however, acquired it by purchase, had it carefully subdivided into numerous pieces, and brought it home safe and complete to Manchester. This was not accomplished without the greatest personal exertions and a considerable expenditure of money (to which several friends contributed), for there were whole waggon-loads of material to be removed. Then the first thing which had to be done was to secure from the University authorities the necessary space for erecting the fossil. This was not an easy matter, and great opposition had to be overcome, as we can easily understand on looking at the specimen, which measures over 29 feet in diameter.

Finally it was fitted together, piece by piece, and fixed in its natural position, resting on a massive pedestal of brickwork. The fiery youthful zeal of a man already over seventy, overcame all the difficulties that arose. People were astonished at the unusual development of energy which this *Stigmara* had caused, and gave it, in good-humoured jest, the name of "Williamson's Folly." "Williamson's Folly" may now be reckoned among the sights of England, and Manchester may be proud of possessing it, for it represents a last gift, worthy of all honour, from the deceased, to the place which for so many years was his home and the scene of his activity.

The author of this notice, who only knew Williamson during the last years of his life, must not attempt to picture to those who lived with him his kindly and

benevolent nature, which always retained the freshness of youth, or his simple character. That would be a work of supererogation, for the whole of scientific England knew and respected him, and wherever he went he was a welcome and honoured guest. The writer can only report, in all brevity, on the work of Williamson's life, and when asked to undertake this, it was with pleasure that he took up his pen for that purpose. SOLMS-LAUBACH.

NOTES.

THE resignation of Dr. Albert Günther, F.R.S., of the post of Keeper of Zoology at the Natural History Museum, South Kensington, is announced. Dr. Günther has occupied for over thirty years the position he now vacates.

THE "Swiney" Lecturer this year is Dr. J. G. Garson, who will take as the subject of the twelve lectures he purposes giving, "The Geological History of Man." The lectures, admission to which will be free, are to be delivered in the lecture theatre of the South Kensington Museum on Mondays, Wednesdays and Fridays, at five P.M., beginning on Friday, October 4.

WE have to record the death of two prominent members of the medical profession abroad, viz. Dr. Pasquale Landi, Professor of Clinical Surgery successively in the Universities of Siena, Bologna, and Pisa, and Dr. Texier, Professor of Internal Pathology in the Medical School of Algiers.

MR. CHARLES MITCHELL, whose death, at the age of seventy-five, occurred on August 22, was a well-known engineer and shipbuilder. He founded the Walker shipbuilding yard on the Tyne, a yard which under his guidance developed into one of the largest in the country. In 1882 it was merged into the Elswick Company of the present Lord Armstrong, and up to the time of his death Mr. Mitchell practically superintended the whole of the shipbuilding work of the Company.

THE *Athenæum* says that during the autumn of this year a monument is to be unveiled at Osteel, in East Friesland, in memory of the discoverers of the sun's spots, David and Johann Fabricius. The site chosen is the place in the cemetery where the grave of the elder Fabricius was discovered about nine years ago.

WE are informed by Prof. John Milne, that communications respecting the *Transactions* of the Seismological Society, and the *Seismological Journal*, may be addressed to him at Shide Hill House, Shide, Newport, Isle of Wight, at which place a small station has been established to record earthquakes having their origin in distant localities, and other unfelt movements of the earth's surface.

THE annual general meeting of the Federated Institution of Mining Engineers will be held in North Staffordshire, at Shelton, Stoke-upon-Trent, on September 18 and 19, when papers on "The Depth to Productive Coal-measures between the Warwickshire and Lancashire Coal-fields," "Gold-mining in Nova Scotia," "The Use of Steel Girders in Mines," "Economic Minerals of the Province of Ontario, Canada," and "The Blasting Efficiency of Explosives" are expected to be read, and a discussion of various papers which have already appeared in the *Transactions* of the Institution may take place. A number of excursions are also arranged.

THE fifth quadrennial meeting of the International Congress of Otolaryngology will take place at Florence, under the presidency of Dr. V. Grazi, from September 23 to 26. Various discussions will be opened by Dr. Barr of Glasgow, Dr. Gellé of Paris, Prof. Gradenigo of Turin, Prof. A. Politzer of Vienna, and Dr. Secchi of Bologna; and there are in the complete programme,

which has just been issued, the titles of no fewer than fifty-nine original communications to be brought before the meeting. It is hoped that British otology will be well represented, as it is intended to invite the next congress to meet in London, either in 1898 or 1899. Full particulars as to terms of membership, routes, hotels, &c., may be obtained from Dr. St. Clair Thomson, 28 Queen Anne-street, W.

AN International Congress of Technical, Commercial, and Industrial Education is being organised by the Société Philomathique of Bordeaux, and is to be held at Bordeaux from September 16 to 21. The programme is, we understand, a full one, and contains many items of interest and importance.

A FEATURE of the annual meeting of the Yorkshire Naturalists' Union, which is to take place at York on October 30, will be an exhibition of specimens, photographs, &c., showing work done during the past year in all departments of the Union. It is requested that all members who intend to exhibit will communicate direct with the Local Secretary, at the Museum, York, on or before October 21.

THE various medical schools will be reopened at the beginning of October, and at most of them introductory addresses will be delivered to the students. On October 1, at St. George's Hospital, the speaker will be Mr. George D. Pollock; at the Middlesex Hospital Dr. W. Julius Mickle, and at the Westminster Hospital Dr. Monckton Copeman. At the latter institution Viscount Peel will distribute the prizes. The introductory address at University College will be delivered by Prof. J. Rose Bradford, and the annual dinner of old and present students will take place at the Hôtel Métropole on October 1, under the chairmanship of Sir Richard Quain, Bart. Mr. A. P. Laurie will give the address at St. Mary's, and the annual dinner will be held the same evening at the Holborn Restaurant, Mr. Malcolm Morris occupying the chair. At St. Thomas's Hospital the prizes will be distributed, on October 2, by Sir Edwin Arnold, K.C.I.E. At Guy's there will be no formal introductory address, but on the evening of October 1 Mr. J. De'Ath will read a paper at the opening meeting of the Physical Society, on "Our Profession, our Patients, our Public and our Press." The annual dinner will take place in the Club Dining Hall, Dr. Pye-Smith in the chair. At the Yorkshire College, Leeds, Prof. D. J. Leech will, on October 1, distribute the prizes and deliver an address. Prof. Victor Horsley is announced to speak at the Sheffield School of Medicine, Mr. Jonathan Hutchinson at University College, Liverpool, and Prof. F. H. Napier at St. Mungo's College. At Mason College, Birmingham, Prof. Percy Frankland will deliver the address, taking as his subject "Pasteur and his Work."

THE Council of the Institution of Civil Engineers has issued a list of suggested subjects for papers during the session 1895-96, for which the undermentioned prizes may be awarded: (1) The Telford Fund, left "in trust, the interest to be expended in annual premiums, under the direction of the Council." The bequest (with accumulations of dividends) produces a gross amount of £235 annually. (2) The Manby Donation, of the value of about £10 a year, given "to form a fund for an annual premium or premiums for papers read at the meetings." (3) The Miller Fund, which, with accumulations of dividends, realises nearly £140 per annum. Out of this the Council has established a scholarship called "The Miller Scholarship," and is prepared to award one such, not exceeding £40 in value, each year, and tenable for three years. Competitors for this scholarship must be under the age of twenty-five years. (4) The Crampton Bequest of £500, the annual income of which amounts now to £13 14s., is devoted to the foundation of "The Crampton Prize," for "presentation to the author of the best paper on the Construction,

Ventilation, and Working of Tunnels of Considerable Length, or failing that, then of any other subject that may be selected." (5) The balance of the Trevithick Memorial Fund of £100 os. 9d., the interest of which is £2 15s. a year. The list of suggested papers, although not exhaustive, is far too long for us to print, but may be had, with further information, upon application to the Secretary of the Institution.

THE Royal Academy of Medical, Physical, and Natural Sciences of Havannah, at a meeting held on April 28, decided to offer amongst other prizes, mostly for medical essays, one—the Cañongo Prize, value 250 dollars in gold—for the best essay on "The Pharmacological Study of the Fluid Extracts." The competition, which is open to any person whether belonging to the medical profession or not, will be closed on March 19, 1896, by which date all papers must be sent in, written in French or Spanish, and sealed, with a motto on the internal envelope, and in another envelope bearing the same motto the author's name and address. The adjudication will take place on May 19, 1896, when the prizes will be distributed to the successful competitors. Further particulars may be obtained by writing to the Secretary, Dr. Vicente de la Guardia, Havannah.

UNDER the active presidency of the Earl of Derby, a vigorous effort is being made by the British Dairy Farmers' Association to give a helping hand to one of the most important branches of agriculture, dairy farming, and its allied industry of poultry raising. At the twentieth annual London Dairy Show, to be held at the Royal Agricultural Hall in October next, prizes to the value of £2515, in addition to 142 gold, silver, and bronze medals, are offered for competition in 451 different classes, in many of which a keen contest is already assured.

AN interesting memoir has been recently published by Dr. Max Müller, on the effect of fever temperature upon the growth and virulence of the typhoid bacillus. In view of the conflicting opinions which have from time to time prevailed on the manner in which a high temperature affects the agent of infection in cases of typhoid fever, these results are of some considerable practical interest. Thus in 1882 we find Jörgensen ventilating the idea that the development of the morbid material in the system in cases of typhoid fever might be retarded by greatly reducing the temperature of the body, whilst other authorities have as confidently stated that the feverish rise in temperature was capable of destroying the typhoid organism, or, at any rate, hindering its development. Both of these opinions are based on very slender experimental evidence. Dr. Max Müller has carried out a series of researches in which he has carefully recorded the growth of the typhoid bacillus at various temperatures, and he states that when preserved at about 40° C. this microbe takes five minutes longer to proliferate, or produce a new generation, than when it is kept at a temperature of from 37.5° to 38.0° C. respectively; that is to say, in the absence of all adverse circumstances, under the most favourable conditions, as many as forty-five generations of typhoid bacilli may proceed in one day from a single parent bacillus at the *normal* temperature of the body, whilst at about 40° C. thirty-nine such generations may be elaborated. In considering these appalling figures it must, however, be remembered that such an uninterrupted multiplication of the typhoid bacillus does not necessarily take place in the human system; the conditions which surround it in the latter case are of a far more complicated and subtle character than those which obtained in Dr. Müller's laboratory culture-tube! But these results show that a fever temperature of about 40° C. is not able to destroy the typhoid bacillus, or to affect its growth to any considerable extent; even higher temperatures of 41.5° to 42.0° C. were also incapable of annihilating this microbe, and typhoid bacilli kept for sixty-two days at 42.0° C. showed subsequently no abatement of their vitality. As regards

the effect of such temperatures on the virulence of the typhoid bacillus, Dr. Müller states, but only as the result of very limited experiments, that he could detect no difference in the behaviour in this respect of those kept at 37° and 40° C. respectively.

A MODIFIED centesimal system of subdividing time and angular measures is advocated by M. H. de Sarrauton, in the *Revue Scientifique*. He proposes to retain the hour as a fundamental unit of time, on account of its universal acceptance, its convenience, and the hopelessness of the task of altering it. But the hour should be divided into 100 minutes, and the minute into 100 seconds. Thus each new minute would be three-fifths of an old minute, or thirty-six seconds, while the new second would be a little over a third of the present second. Two of the new seconds would cover the time of a brisk step, like the accelerated pace used in the French army. The new second is the time taken by one semi-vibration of a simple pendulum 12.9 cm. long. Time could then be consistently expressed in hours and decimals. Thus 8.3348 h. might be read 8 hours 33 (new) minutes 48 (new) seconds, and calculations involving time would be much simplified. Clock and watch dials would be subdivided into hours, as usual, but the smaller divisions for the minute and seconds hands would be hundredths of the circle instead of sixtieths, and every tenth division would have to be slightly marked. For angular measurement, M. de Sarrauton proposes 240°, subdivided into 100 minutes of 100 seconds each, so that they could be converted into hours by shifting the decimal point one place to the left.

A FEW particulars of the new mouth of the Vistula are given in the *Globus*. It was made by regulating the old branch going into the Baltic, which was straightened and shortened from ten miles to four and a half, while the channel was broadened by shifting the dyke on the left bank six miles to the west. At the same time, the Danzig branch was cut off by a lock. This useful piece of work will not only make the Vistula more accessible, but will prevent the disastrous floods which caused far-reaching destruction in winter and spring, near the mouth of the river. The work cost a million pounds, half of which was borne by the districts concerned, and half by the German Treasury.

THE current number of the *British Medical Journal* has a note on the vision of School Board children, based upon a report of Dr. James Kerr, medical superintendent of the Bradford School Board. The tests employed were designed to detect every child who had not good distant vision with one eye at least, the list of children thus obtained including those with defect of distant sight from all causes, remediable or otherwise. Such a list having been made, it was an easy matter to more fully examine all the children thus tabulated, and to classify and deal with them as might be necessary. In the report, tables are given showing the number of children examined, and the percentage of defective eyesight in the different standards from one to seven. A perusal of Dr. Kerr's report will, in the opinion of our contemporary, well repay those who have to conduct similar examinations of large numbers of school children.

WE have received from the Deutsche Seewarte (Hamburg) the report of its labours during the year 1894. The duties of this institution differ materially from those of the German Meteorological Institute (Berlin), whose report we lately noticed, inasmuch as the former deals specially with weather prediction and marine meteorology. In both of these branches great activity is shown, and we have frequently referred to the useful work carried on. The detailed discussion of the meteorology of the various oceans, for the benefit of seamen, the preparation of synoptic weather charts of the North Atlantic Ocean, for the advancement of practical meteorology, and the publication of

observations taken in remote parts of the world, are noteworthy instances of the industry of the institution. For the purpose of obtaining information relating to maritime meteorology, it has not only established many agencies in German ports, but the Consuls in several foreign ports, including English, also take part in enlisting observers and supplying the necessary registers; the result being that about 450 voluntary observers were co-operating at the end of the year in the mercantile marine alone.

THE annual report of the Department of Mines and Agriculture, New South Wales, for the year 1894, has come to hand. In it reference is made to the resignation of the position of palæontologist of Mr. Robert Etheridge, occasioned by his accepting the curatorship of the Australian Museum. Mr. Etheridge will, however, we are pleased to notice, still retain connection with the department, having, the report says, volunteered to act as honorary consulting palæontologist.

WE have received from the Keeper of the Manchester Museum, Owens College, a new handy guide to the museum, which has been compiled for the purpose of indicating cursorily the principal objects in the building and its general arrangement, for the benefit of visitors whose time is limited. To those who can afford time to pay several visits, the illustrated guide is recommended as being more complete and useful.

THE new part of the *Asclepiad*, Sir B. Ward Richardson's quarterly, contains articles on "Cycling and Heart Disease," "The late prevailing Epidemic," and, with portrait, "John Abernethy, F.R.S."

THE additions to the Zoological Society's Gardens during the past week include two Macaque Monkeys (*Macacus cynomolgus*, ♂ ♀) from India, presented by Mr. Hugh H. Collis; a White-tailed Sea-Eagle (*Haliaetus albicilla*) from Northern Russia, presented by Mr. Robert Ashton; two Red-backed Shrikes (*Lanius collurio*), British, presented by Mr. C. Ingram; a Natterjack Toad (*Bufo calamita*) from Surrey, presented by Mr. Hanley Flower; a Melodious Jay Thrush (*Leucodiotroon canorum*), deposited, a — Capuchin (*Cebus* ? ♂), a Porto Rico Pigeon (*Columba corensis*), a Vinaceous Pigeon (*Columba vinacea*), a Barn Owl (*Strix flammea*), seven Adorned Ceratophrys (*Ceratophrys ornata*) from Brazil, purchased; a Great Kangaroo (*Macropus giganteus*, ♂), a Rufous Rat Kangaroo (*Hypsiprymnus rufescens*, ♂), a short-headed Phalanger (*Belideus breviceps*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE FORMS OF JUPITER'S SATELLITES.—A paper, by Mr. S. I. Bailey, on the forms of the discs of Jupiter's satellites, is communicated by Prof. E. C. Pickering to the current *Astro-physical Journal*. A number of observations of the satellites has been made with the thirteen-inch refractor at the Arequipa Observatory; and the results were: "Under the best conditions, that is, with the instrument in perfect adjustment and good seeing, satellites II., III. and IV. were always seen round. Satellite I. was twice seen having an apparent elongation in the same direction as Jupiter. In both cases the satellite was near the planet. On the second occasion, I., when off the disc, but near Jupiter, appeared elongated, but an hour later, plainly seen on the disc of Jupiter, it appeared perfectly round. On the other hand, the shadows of I. and III. on other nights were seen elongated. Several occultations and transits were observed, but the limb of Jupiter was not seen when, to me, it gave any indication of transparency. . . . During the hours given, we failed to detect any systematic change of form in any of the satellites. These observations, scattered through the cloudy season, may not be the best possible, for the same observers and instrument in Arequipa, nevertheless it does not seem probable to me that any frequent periodic recurrence of an ellipticity, approximating in amount that of Jupiter itself, would have escaped detection."